REMARKS

Claims 27-31, 37 45-47 and 49 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Sopko et al. `601 (U.S. Patent No. 4,022,601) in view of Hashizume `817 (U.S. Publication No. 2001/0031817) and Gerhardinger et al. `199 (U.S. Patent No. 5,714,199). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

Sopko et al. `601 relates to a method and apparatus for coating a glass substrate, but as the Examiner acknowledges, the reference discloses a method of depositing a vaporized pyrolizable organometallic salt material onto an upper surface of the glass substrate using vaporization nozzles. In distinction, each of the rejected claims of the application recites the steps of depositing and curing a thermosetting powder on such a surface. The scope and content of Sopko et al. `601 relates to a substantially different art from that with which the present invention claims. It is accepted that Applicant's invention (as defined by the rejected claims) and Sopko et al. `601 is pertain to depositing a coating on a glass substrate, but the basic principles of the method utilized for establishing the coating in the two cases, the nature of the materials involved and the form in which they are used, are fundamentally different from one another.

In the latter respect, the Applicant's claimed method utilizes the technique of powder coating, that is to say, a technique in which a polyester thermosetting material is deposited in powder form on a surface of the substrate, and the layer of powder so formed is heated to fuse the powder and bring it through its melt phase into the gel state and then on through cross-linking to a fully-cured state. The method taught by Sopko et al. `601 on the other hand, utilizes a technique in which a coating fluid in the form of a *heated* coating vapor or a coating spray of an organo-metallic composition is directed onto a *heated* surface of the substrate, and the heat of the surface pyrolyzes the vapor or spray of the organo-metallic composition into a

metal-oxide coating (col. 1, Ins. 43-47). Moreover, it is taught in the Sopko et al. `601 method that the temperature required for pyrolyzing the vapor or spray is above some 566° C (col. 6, lns. 27-29) which is more than double the temperature used for curing a powder coating of the invention.

It is submitted that a person skilled in the art of powder-coating a substrate would not be motivated to consider the teachings Sopko et al. `601 since that teaching is concerned for the reasons reviewed above, with a method of coating that differs fundamentally in significant aspects from powder coating. The teaching of Sopko et al. `601 of coating with a pyrolitic oxide by application of a heated vapor or spray of an organo-metallic composition, has no obvious relevance to the art of powder coating. Accordingly, the Applicant submits that the differences between the claims of the application and the teachings of Sopko et al. `601 are so great and unrelated in any manner that one of ordinary skill in the art would not have considered any aspect of what is taught by Sopko et al. `601 as having usefulness in a powder-coating method.

The differences between the prior art of Sopko et al. `601 and the method claimed by Applicant are significant as detailed above. Claims 27-31, 37, 45 and 46 of the application recite a method of manufacturing a powder-coated glass product in which a thermosetting powder is deposited on a first surface of a glass substrate, and the deposited powder deposited on the first surface is cured to form a coating on the first surface by the application of heat to the thermosetting powder by transmission of the heat through the glass substrate from the second surface to the first surface of the substrate. Sopko et al. `601 teaches a fundamentally different method of coating with a pyrolitic oxide through application of a heated vapor or spray of an organo-metallic composition.

Against the differences however, the Examiner selects for special attention a feature of the Sopko et al. `601 system, namely the heating means represented by a pair of heaters 108, which may be infra-red lamps or reflectance heaters (col. 10, lns. 3-5), that are used to heat

the undersurface of the Sopko et al. '601 glass substrate. The purpose of this heating means is quite clearly stated and emphasized by Sopko et al. '601 to be for reduction of warpage of the glass substrate (col. 10, lns. 3-5). Reduction of warpage is the sole purpose advanced by Sopko et al. '601 for use of the infra-red or other heating of the under-surface of the glass substrate. Explanation for the need to reduce warpage is given by Sopko et al. '601 at lines 28-36, column 9, in particular, that:

... the vacuum hoods 38 and 40, and the nozzles 64 of the coating apparatus 10 of the type [disclosed] are spaced about 3 inches (8 centimeters) and ½ inch (0.32 centimeters), respectively. [above the upper surface of the glass substrate so that a] warped glass ribbon can hit the nozzles and/or vacuum hood scratching or fracturing the glass ribbon.

The teaching of Sopko et al. `601 in relation to the provision of heating means under the glass is accordingly to avoid damage to the glass from the required close proximity to the upper surface of the specialist equipment, the spray nozzles in particular, used for vapor deposition. Furthermore, the warpage of the glass that gives rise to the basic likelihood of damage, results from the elevated temperature (above 566° C) used for the pyrolytic vapor-deposition process. This temperature is near the temperature (649° C) at which the glass is not dimensionally stable (col. ,6 Ins. 61-63).

Against this background of the fundamental differences referred to above between Applicant's claimed method of powder coating and the Sopko et al. `601 method of deposition of a vaporized pyrolizable organometallic salt material, The Applicant asserts that there is no aspect of the under-surface heating taught by Sopko et al. `601 that would motivate a skilled person to adopt under-surface heating in a powder-coating method. In addition to the extremely lower temperature requirements of powder-coating, there is no material likelihood of warpage

of the glass substrate, and the equipment required to deposit the powder on the upper-surface is not in any event so close to that surface as to give rise to danger of damage to the glass.

The Examiner takes the position that "... heating the substrate from the opposite side of the vaporization nozzles would also result in an even coating of the deposited material due to the reduction of warpage thereby reducing the defects within the coating (i.e. uneven coating of material)" [paragraph 3, lines 5-9 of Detailed Action].

It is noted that there is absolutely no reference by Sopko et al. '601 to the heating of the substrate from the opposite side ('under-surface') affecting evenness or any other quality of the coating. The only reference by Sopko et al. '601 to the quality of the coating produced by the vaporization nozzles 64, is to improve durability resulting from use of the heat source 80 above the glass (column 3, line 16). The effect of heating the under-surface of the glass is contrasted with this (column 3, line17) as reducing glass warpage, and is emphasized strongly as being independent of the formation of the coating above. In the latter regard, attention is directed to the paragraph between lines 18 and 26 of column 10 of the Sopko et al. '601 disclosure where three possibilities are set out drawing distinction of purpose between heat applied above and heat applied below; see especially the distinction of purpose between items (2) and (3) of that paragraph.

Accordingly, the position taken by the Examiner in the passage quoted above from the official action, as to the effect of heating the under-surface of the glass is, with due respect, purely speculative. Indeed that position is contrary to the explicit teaching and explanation given in the cited Sopko et al. `601 disclosure.

The Examiner acknowledges that Sopko et al. `601 is silent concerning deposition and curing of a thermosetting powder material and in referring to Hashizume `817 in paragraph 4 of the Detailed Action, alleges that, "... one of ordinary skill in the art, due to environment

considerations would have known to modify the process by involving the present composition." [paragraph 4, lines 7-8 of the Detailed Action].

The allegation made by the Examiner's here is that one of ordinary skill in the art would know to modify the process taught by Sopko et al. `601, by involving the "present composition" (implied to be that of Hashizume `817, namely a powder coating composition). The Applicant asserts that it is manifestly clear, and would be manifestly clear to the skilled person, that it is not possible to modify the Sopko et al. `601 process to deposit thermosetting powder without a radical change to that process. Thermosetting powder cannot be deposited as a coating fluid in the form taught by Sopko et al. `601, namely in the form of a heated coating vapor or a coating spray at the temperatures used by Sopko et al. `601 since the powder would cure into a solid mass before it reached the glass. Radical change of what Sopko et al. `601 teaches both as to process and apparatus would clearly be required to give effect to what the Examiner is suggesting, and the Applicant submits that this would require mutilation of what Sopko et al. `601 teaches.

Moreover, in response to Applicant's assertion that the combination of references applied (namely, Sopko et al. '601 in view of Hashizume '817) teach away and would destroy the apparatus taught by Sopko et al. '601, the Examiner notes that "the Applicant is not claiming an apparatus and merely a method of forming a coating upon a glass surface". The Applicant respectfully emphasizes that Sopko et al. '601 teaches a method of coating a glass substrate (see especially the title to the citation, and his claims 1-7), and that the apparatus disclosed by Sopko et al. '601 is essential of the method taught. The Examiner has tacitly accepted that the method of coating taught by Sopko et al. '601 of vaporizing an organometallic salt material, is different in principle from the claimed method of producing a coating by deposition and subsequent curing of a thermosetting powder material and has not contested the steps Applicant advanced (on page 8 of Applicant's Amendments/Arguments filed June 29,

2009) that it would require very significant and sweeping change to modify the Sopko et al. `601 teaching in the way alleged by the Examiner.

In order that Applicant's case for contesting the Examiner's allegation may be given due consideration, it is repeated here. The Applicant asserts that the 'modification' proposed by the Examiner would require the following changes of the Sopko et al. `601 apparatus:

- (a) the Sopko et al. `601 coating chamber 12 with its vaporization nozzles 64 and including its vacuum hoods 38 and 40 and other equipment, would be replaced by an electrostatic powder spraying unit (as used by Hashizume `817) or some other appropriate means of depositing the powder; and
- (b) the Sopko et al. `601 heat source 80 above the glass would be eliminated since the temperature at which deposition of the powder on the substrate takes place is significantly lower than the temperature (some 566° C see Sopko et al. `601 column 6, lines 27-29) at which the pyrolytic oxide coating is produced by Sopko et al. `601 it is to be noted in this connection that as taught by Hashizume `817, baking of the thermosetting powder takes place at "preferably 170 to 230 degrees Centigrade" (Hashizume `817 paragraph [0028], line 7).

These steps (a) and (b) in and of themselves amount to mutilation of what is taught by Sopko et al. '601 and are entirely destructive of that teaching – the removal of the apparatus required for performance of the Sopko et al. '601 method is concomitant with mutilation of the teaching of the method. Further, the provision of the heater 80 is of the essence of the Sopko et al. '601 teaching in achieving the durable coating that Sopko et al. '601 sets out to obtain in eliminating the limitations of the prior art pyrolytic oxide coating process (col. 2, Ins. 25-27).

Dispensing with the equipment for pyrolytic oxide coating takes away all reason for the Sopko et al. `601 disclosure and removes any relevance of the heater 80.

Sopko et al. '601 is cited by the Examiner as the primary reference. The Applicant notes in this regard, as made absolutely clear **In re Ratti, 270 F.2d at 813, 123 USPQ at 352**, that rejection of a claim is untenable where, "... the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in the primary reference as well as a change in the basic principle under which the primary reference construction was designed to operate."

It is submitted that in the present circumstances as outline above, the suggested combination of Sopko et al. `601 in view of Hashizume `817 would require a substantial reconstruction and redesign of the elements shown in Sopko et al. `601 as well as a change in the basic principle (namely deposition of a vaporized pyrolizable organometallic salt material onto an upper surface of a glass substrate using vaporization nozzles) under which the apparatus, as taught by Sopko et al. `601, was constructed and designed to operate. In these circumstances on the basis of the above remarks and the clear precedent identified above, it is submitted that the 'modification' proposed by the Examiner is untenable and does not support a rejection, under 35 U.S.C. § 103(a) of claims 27-31, 37, 45-47 and 49.

Furthermore, the 'modification' as proposed by the Examiner, if carried out, removes any relevance of the under-surface heaters 108 or corresponding infra-red heaters. The hypothesis advanced by Sopko et al. '601 for under-surface heating of the glass substrate is that there is cooling of the top-surface when vapor-deposition of the pyrolytic oxide coating takes place, and that, "[h]eating the bottom surface 112 of the glass ribbon makes it pliant and the glass ribbon slumps under its own weight thereby minimizing or eliminating the glass ribbon warpage. [column 10, lines 15-17].

This is in the context of the top-surface of the Sopko et al. '601 glass surface being at a temperature of at least 566° C (col. 6, Ins. 27-29) which is more than double any temperature required for baking the Hashizume '817 thermosetting powder (paragraph [0028], lines 6-8). Thus, if the Sopko et al. '601 process and apparatus were to be modified "by involving the present composition" as proposed by the Examiner, the heating of the "bottom surface 112 of the glass ribbon" as taught by Sopko et al. '601 for reducing warpage of the glass would be without purpose. The much lower temperatures at which the powder coating would be deposited and baked would not affect the upper-surface of the ribbon or substrate in the way Sopko et al. '601 experience, and heating the under-surface to make it pliant would be undesirable and indeed might well result in warpage (the precise defect that the under-surface heating is intended to eliminate).

Accordingly, it is submitted that even if the skilled person were to adopt the 'modification' proposed by the Examiner, the under-surface heating used by Sopko et al. '601 would not be retained since this would have no apparent beneficial effect in relation to depositing powder on the top-surface of the glass substrate. Indeed, because of the much lower temperature involved in adoption of the powder-coating technique, instead of the elevated temperature involved in the vapor-deposition of the pyrolytic oxide coating, one skilled in the art would recognize that under-surface heating would be neither necessary nor desirable and could induce warpage rather than correct for it. There is nothing taught by Sopko et al. '601 that would deter one skilled in the art from rejecting under-surface heating of the glass substrate, rather the opposite in that there is much to incite rejection of it.

It is submitted therefore that even if one skilled in the art were to 'modify' the Sopko et al. `601 process and apparatus to adopt the Hashizume `817 teaching of deposition of powder-coating material, the resultant process and apparatus would not be in accordance with the present invention as specified in claims 27-31, 37 and 45-47 and 49. The Hashizume `817

teaching does not involve heat applied to cure the thermosetting powder by transmission of heat through the glass substrate, as required by independent claims 45, 47 and 49.

The art with which Hashizume '817 is concerned is very different technically from that with which Sopko et al. '601 are concerned. Both Hashizume '817 and Sopko et al. '601 are concerned with establishing a coating on a substrate, but the coating materials are significantly different in the two cases and the techniques used are very different to the extent that one skilled in the art considering the Sopko et al. '601 vapor-deposition process and apparatus would immediately understand that that process and apparatus, and the techniques and temperatures adopted for them, would not be applicable for producing a coating of thermosetting powder. Such a skilled person would accordingly not seek to 'modify' the Sopko et al. '601 process and method in the way proposed by the Examiner, and it would require invention to do so.

The Examiner advances environmental considerations as the motivation for the skilled person to make the proposed 'modification' of the Sopko et al. '601 process and apparatus. But if the skilled person is aware of the Hashizume '817 technique of coating using thermosetting powder as advantageous environmentally over the Sopko et al. '601 process and apparatus, it must be asked why would the skilled person proceed by radical 'modification' of the Sopko et al. '601 process and apparatus to adopt the Hashizume '817 teaching? It is submitted that the skilled person rather than seeking to use the Sopko et al. '601 process and apparatus and to 'modify' it in the extensive way required for thermosetting-powder coating, would more simply and directly adopt the Hashizume '817 (or Gerhardinger et al. '199) teaching. The less environmentally advantageous Sopko et al. '601 process and apparatus contains nothing of any explicit or implicit relevance to powder coating, and for this reason would clearly be discarded.

The Examiner states in paragraph 7 of the Detailed Action that, "... All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. The Courts have made it clear that the teaching, suggestion, or motivation test is flexible and an explicit suggestion to combine the prior art is not necessary. The motivation to combine may be implicit and may be found in the knowledge of one of ordinary skill in the art, or in some cases, from the nature of the problem to be solved."

But in the present case, the requirement of each of the independent claims 45, 47 and 49 for the application of heat to the thermosetting powder by transmission of the heat through the glass substrate to cure the thermosetting powder is not known from either Sopko et al. `601 or Hashizume `817, or (as previously accepted by the Examiner) Gerhardinger et al. `199. The Sopko et al. `601 heat source beneath the glass has the function of heating the bottom surface 112 of the glass ribbon to make it pliant in order to eliminate or minimize glass ribbon warpage (col. 10, lines 14-17). It does not apply heat to cure thermosetting powder by transmission of the heat through the glass substrate as required by independent claims 45, 47 and 49. More especially, adopting the terms of the precedent cited by the Examiner, no "suggestion [that] may be gleaned from the prior art as a whole", to motivate, nor is there any "improvement that is technology-independent" and nor would "the combination of references result in a product or process that is more desirable".

It is submitted with due respect that fundamentally no objective reason to combine the teachings of the cited references has been put forward, and that therefore a prima facie case of obviousness has not been established [In ex parte Levengood 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)].

In all the above circumstances, it is submitted that each of claims 27-31, 37 and 45-47 and 49 is patentable over the cited art of Sopko et al. `601, in view of Hashizume `817 and Gerhardinger et al. `199.

The new, independent claim 50 includes all the limitations of claim 45, and it is submitted therefore that claim 50, like claim 45, is patentable over Sopko et al. `601 in view of Hashizume `817 and Gerhardinger et al. `199 as argued above. Also in this respect, the new claim 50 specifies explicitly that the thermosetting powder deposited on the first surface of the glass substrate is cured by a step comprising application of heat to the thermosetting powder solely by transmission of the heat through the glass substrate from the second surface to the first surface of the glass substrate. The Examiner has remarked in response to the arguments as previously advanced by Applicant that, "... Applicant has not explicitly recited that heat cannot be provided from the top as well as the bottom."

Claim 50 specifies that the heat (for curing the thermosetting powder) is solely from the bottom (the second surface of the glass substrate), and the claim thereby provides an explicit exclusion of involvement of heat from the top (the first surface) to bring about curing. The claim accordingly meets the requirement identified by the Examiner in further distinguishing the present invention from the cited disclosure of Sopko et al. `601.

Claim 32 is rejected, under 35 U.S.C. § 103(a), as being unpatentable over Sopko et al. `601 in view of Hashizume `817 and Gerhardinger et al. `199 and further in view of Horinka et al. (article). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

Claim 32 is dependent on claim 29 which depends on claim 45, and accordingly includes all the limitations of claim 45, and is submitted to be, like claim 45, distinguished patentably from Sopko et al. `601 in view of Hashizume `817 and Gerhardinger et al. `199 as argued above. It is submitted that the disclosure of Horinka et al adds nothing material to change that distinction.

Claims 33-36, 38- 40-44 and 48 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Sopko et al. `601 in view of Hashizume `817 and Gerhardinger et al. `199

and further in view of Boucher et al. `466 (U.S. Patent No. 3,549,466) and Storrs `964 (U.S. Patent No. 1,988,964). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

In this regard, claims 33-36 and 38 are each directly or indirectly dependent on claim 45, and so, it is submitted, that are each as argued above in relation to claim 45, are patentably distinct from the cited art. Neither Boucher et al. `466 nor Storrs et al. `964 adds anything of relevance to vitiate the above arguments for patentability of claim 45.

Furthermore, it is submitted that claims 40-44 and 48 are each distinct from the art cited against them, and that claims 33-36 and 38 are further distinguished from that cited art, in that there is no disclosure of all the features of the invention recited in the claims. This assertion is accepted by the Examiner in paragraph 17 on page 8 of the Detailed Action, but the Examiner follows acceptance of this by characterizing Boucher et al. `466 and Storrs et al. `964 as "teaching references" in respect of the concept of, "... metal foil and an inward extension in order to yield an edge seal feature that is capable of providing dual pane glazings protection from moisture, dust, and dirt and in combination with the primary reference discloses the presently claimed invention."

Following this, the Examiner identifies Boucher et al. `466 as disclosing, "... the use of metal edge seals on a transparent assembly" and Storrs et al. `964 as disclosing, "... a metal edge strip as holding means that forms inward extensions."

However, it is to be noted that the teaching by Storrs et al. '964 concerning "a metal edge strip" is limited to the edge binding 16 of Figure 2, which is identified on page 2, within lines 56-67 simply as "a metal strip held on by friction or otherwise" [the Storrs et al. '964 edge bindings 35 and 46 of Figures 4 and 5 respectively are referred to in unspecific terms on page 3, lines 15-17 and 30-31, and the item 52 of Figure 6 is described on page 3, lines 52-68 as a

"metallic molding" as distinct from a metal strip]. There is nothing taught by Storrs et al. `964 concerning the extent to which their "metal strip" is to extend from the edge.

Thus, the "teaching references" provided by Boucher et al. `466 and Storrs et al. `964 donot teach anything relevant to the limitation of claim 40 that, "... the metal foil extends inwardly only partially across the back surface from the edges by a distance within the range of 100 – 150 mm for reduction of thermal stress in the glass substrate."

Moreover, the "teaching references" do not teach anything going beyond the "metal strip" being "held on by friction or otherwise" to the surface of the glass itself. Although the, "or otherwise" may extend to adhesion to the glass surface, there is no teaching relevant to the further requirement of claim 40 that the metal foil is, "... bonded to a back surface of the thermosetting powder coating [of the glass]."

Accordingly, it is submitted that the cited references provide no teaching as to the above two features of claim 40, one relating to the specific range of extension of the foil from the edge for reducing thermal-stress of the glass substrate, and the other the bonding of the foil to the powder coating on the glass (rather than to the glass itself), which distinguish the powder-coated glass product of claim 40 from the cited art. The fact that the bonding of the foil to the coating rather than to the glass, and the fact that the limited extension of the foil onto the coating rather than the glass results in thermal-stress relief to the glass is surprising and clearly not an obvious outcome from what is taught by the cited references. In these circumstances therefore, it is submitted that the powder-coated glass product is clearly patentable over the cited art.

It is notable that the property of thermal-stress relief by the use of foil is not advanced in any of the cited art to provide motivation towards adoption of the teachings of the "teaching references". Claims 40 and 48 include wording to emphasize this quality attributable to the invention.

Each of claims 41-44 is dependent directly or indirectly on claim 40 and is therefore correspondingly also patentable over the cited art.

Claim 48 recites a spandrel panel that includes the features of (a) metal foil bonded to the back surface of a thermosetting powder coating on a glass substrate, and (b) extension of the foil inwardly from edges of the coating by a spacing that is between 100 mm and 150 mm, for reduction of thermal stress in the glass substrate. Thus, it is submitted that the spandrel panel of claim 48, like the product of claim 40, is patentable over the cited art.

Furthermore, each of claims 33-36 and 38 (which as already submitted above are patentably distinguished from Sopko et al. `601 in view of Hashizume `817 and Gerhardinger et al. `199, through their dependency on claim (45) include the features (a) and (b) identified in relation to claim 48, or in the case of claim 34 feature (a) and a more limited form of feature (b). Accordingly, the patentability of each of claims 33-36 and 38 is confirmed further.

In the light of the above, it is submitted that each of the claims currently presented in the application is patentable over the cited art, and a favorable decision is requested.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejections or applicability of the Sopko et al. '601, Hashizume '817, Gerhardinger et al. '199, Horinka et al., Boucher et al. '466 and/or Storrs '964 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be

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withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

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